UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/551,271	09/28/2005	Masahiro Tada	09792909-6378	4665

26263 7590 08/28/2007

SONNENSCHEIN NATH & ROSENTHAL LLP
P.O. BOX 061080
WACKER DRIVE STATION, SEARS TOWER
CHICAGO, IL 60606-1080

EXAMINER	
TSAI, H JEY	

ART UNIT	PAPER NUMBER
2812	

MAIL DATE	DELIVERY MODE
08/28/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/551,271	TADA ET AL.	
	Examiner	Art Unit	
	H.Jey Tsai	2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 June 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner 2005/0221528, previously cited.

Brunner discloses a method for manufacturing a micromachine including an oscillator, comprising:

a step of forming a sacrifice layer 209, 205 around a movable portion of the oscillator 206; para. 26, 37-49, figs 3a-3f,

the sacrifice layer 209, 205 comprising silicon oxide, para. 40, 38,

a step of covering the sacrifice layer with an overcoat film 211,

followed by the formation of a penetrating hole 213 reaching the sacrifice layer 209, 205 in the overcoat layer 211;

a step of performing sacrifice-layer etching for removing the sacrifice layer 209, 205 using the penetrating hole 213 in order to form a space around the movable portion 206; and a step of performing a film-formation treatment at a reduced pressure (vacuum) following the sacrifice-layer etching so as to seal the penetrating hole, para.46.

regarding claim 2, wherein the method is applied to a micromachine having means for driving oscillation in the oscillator, para. 26, 46.

regarding claim 5, wherein the film-formation treatment at a reduced pressure is a film-formation treatment by sputtering, para. 46.

The difference between the references applied above and the instant claim(s) is: Bruner teaches at para. 40 and 38, using doped silicon oxide for sacrificial layer 209 and 205. However, Bruner also teaches at para. 10, preferably the silicon oxide is silicon dioxide; when silicon oxide is referred to in this document, silicon dioxide is the most preferred embodiment, although conventional, doped and/or non-stoichiometric silicon oxides are also contemplated.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above Brunner's teachings at para. 38 and 40 by using silicon dioxide as sacrificial layer as taught by Brunner et al. at para. 10 because silicon dioxide can be easily formed with CVD deposition or thermal growth process.

Claims 3-4 are rejected under 35 U.S.C 103 as being unpatentable over Bruner as applied to claims 1-2 and 5 above, and further in view of Lin et al. 5,589,082 or Schmid 6,761,068, previously cited.

The difference between the references applied above and the instant claim(s) is: Bruner teaches forming a MEMS device having an oscillator but does not teach the means for driving the oscillation. However, Lin et al. teaches at col. 1, lines 25-31,

means for driving oscillation is piezoelectric and at col. 1, lines 60-65, means for driving oscillation is electrostatic force. Lin et al. also teaches at fig. 7Q-7S, col. 11, lines 17-37, a step of forming a sacrifice layer 452 around a movable portion of the oscillator 450, a step of covering the sacrifice layer with an overcoat film 456, followed by the formation of a penetrating hole 458 reaching the sacrifice layer 452 in the overcoat layer, a step of performing sacrifice-layer etching for removing the sacrifice layer 452 using the penetrating hole 458 in order to form a space around the movable portion 450; and a step of performing a film-formation treatment at a reduced pressure following the sacrifice-layer etching so as to seal the penetrating hole. Schmid teaches at col. 4, lines 1-12, means for driving oscillation are static electric or piezoelectric.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above references' teachings by using static electric or piezoelectric for driving oscillation as taught by Lin et al. or Schmid because static electric and piezoelectric would cause the movable portion of the device to oscillate so that a oscillation is formed.

Conclusions

Applicant's arguments filed on June 29, 2007 have been fully considered but they are not persuasive. Because Brunner teaches at para. 38, 40, first and second sacrificial layers 205 and 209 are silicon oxide. And, Brimmer teaches at para. 10, preferably the silicon oxide is silicon dioxide; when silicon oxide is referred to in this

document, silicon dioxide is the most preferred embodiment, although conventional, doped and/or non-stoichiometric silicon oxides are also contemplated.

At para. 38:

> Alternatively, the first sacrificial layer 205 can comprise a doped silicon oxide layer that is doped with boron, phosphorus or any other dopant which renders the first sacrificial layer 205 to be preferentially etched over the substrate 201 or etch-stop layer 203 and/or the etch-stop layer 206 and capping layer 211, described in detail below.

At para. 40:

> Alternatively, second first sacrificial layer 209 can comprise a doped silicon oxide layer that is doped with boron, phosphorus or any other dopant which renders the sacrificial layer 209 to be preferentially etched over the substrate 201 or etch-stop layers 203 and 207.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to H. Jey Tsai whose telephone number is (571) 272-1684. The examiner can normally be reached on from 7:00 Am to 4:00 Pm., Monday thru Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael S. Lebentritt can be reached on (571) 272-1873.

The fax phone number for this Group is 571-273-8300.

hjt

8/25/2007

H. Jey Tsai
Primary Examiner
Patent Examining Group 2800